Division of Space

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Random lines

Miles (1964) studies the line system, $p = x\cos\theta + y\sin\theta$, where $-\infty < p < \infty$ and $0 \leq \theta < \pi$. Chan (1990) studied numerical properties of such structure of random lines using the same generator and then used it to model the structure of non-woven media. This amounts to the study by simulation of filters the internal structure of which is fibre mat, for example polypropylene. The algorithm he developed deals with mechanical blocking and back-flushing of the fibres. Wilcock's study (1994), on the other hand, deals with woven materials. With them she tried to demistify the myth and mysteries surrounding the rule of thumb techniques in designing wire mesh demisters. Her algorithms first weave the mesh and then apply Monte Carlo to it for the simulation.

The steel and carbon fibres in cement pastes contributes respectively to hole- and electron conductions (Wen and Chung, 2000). This is a problem of percolation of interconnected random lines. On the other hand, we can also study the resistance instead of conductance, which is what Pennetta *et al* (2000) does for a random network of resistors. Interest in researches on random resistor or conductor networks is strong (for example, Pennetta *et al*, 2001). Cheng *et al*(2001) look at NiMH (nickel metal hydride) batteries' electrodes. In their presentation they wrap all the ends of those fibres that stick out from the prototile. This gives the periodicity which they use in their simulation. The NiMH has high porosity, no less than 97 per cent, and it contains two or more phases.

Some recent developments related to polypropylene are those done by Mironi-Harpaz and Narkis (2001), Narkis *et al* (2000), and Zhang *et al* (2001). Those who study the conductivity and resistivity of materials are, for example, Benoit *et al* (2001), Broderix *et al* (2001), Flandin *et al* (2001), Hindermann-Bischoff and Ehrburger-Dolle (2001), Huang *et al* (2001), Hunt (2001), Jevtic *et al* (2001), Nielson (2000), Petrovsky and Rak (2001), and Stenull *et al* (2001). An example of the application to dentistry is that which is reported by Sharp *et al* (2000). Rong *et al* (2001) look at tensile curves and study the resistance to thermal deformation in nanocomposites.

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